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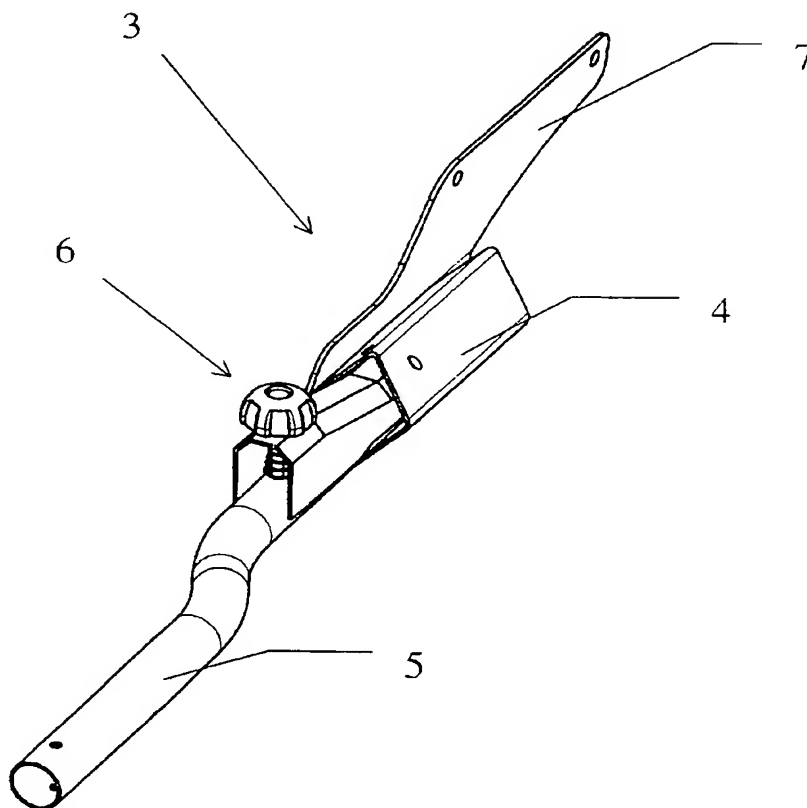
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[Continued on next page]

(54) Title: COUPLING DEVICE FOR A LOAD CARRIER



(57) Abstract: A coupling device (3), for coupling a load carrier (2) to a vehicle, preferably to the rear section (1) of the vehicle. The coupling device comprises a sleeve (4), which is mounted on the rear section (1), and a shaft (5), which is mounted on the load carrier (2), and the coupling is realized in that the shaft (5) is mounted into the sleeve (4), whereupon the shaft (5) is secured to the sleeve by means of a securing device (6), which is arranged on the shaft (5) wherein the securing device (6) comprises a lever link (10) that is, at a first end (11), pivotably arranged on the shaft (5) at its first end (8) by means of a pivot axes (12), which first end (8) is mounted to the sleeve (4) and, at a second end (13), in connection by means of a tension mechanism (14) with the shaft (5). The lever link (10) can be pivoted by the tension mechanism in a direction (P) away from the shaft (5), whereupon the lever link (10) and the shaft (5) are brought into secure clamping engagement with the inner walls (25) of the sleeve (4) when the shaft (5) is mounted to the sleeve (4).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

COUPLING DEVICE FOR A LOAD CARRIER

Technical field

The present invention relates to a coupling device, for coupling a load carrier to a vehicle,
5 preferably to the rear section of the vehicle. The coupling device comprises a sleeve, which
is mounted on the vehicle, and a shaft, which is mounted on the load carrier, and the
coupling is realized in that the shaft is mounted into the sleeve, whereupon the shaft is
secured in the sleeve by means of a securing device.

State of the art

Coupling devices of the described type are commonly seen. They generally appear as so-
called "hitch mounts" or "hitch posts," primarily on the American market, and there
preferably on vehicles such as smaller platform-equipped vehicles, delivery vans and
similar vehicles. These devices preferably comprise a sleeve of square material, which is
15 secured to the vehicle, and a shaft consisting of square material, which is secured to the
load carrier. The securing device usually consists of a pin that is introduced through holes
in the sleeve and shaft, which holes line up with one another when the shaft is mounted in
the sleeve. The disadvantage with such earlier hitch devices is that the play that must be
present to enable the shaft to be introduced into the sleeve is not taken up by the pin, which
20 means that the load carrier can vibrate forcefully when the vehicle is operated on roads with
uneven pavement. These vibrations entail a risk that the cargo carried by the load carrier
may be damaged or, in the worst case, come free from the load carrier entirely. Another
disadvantage of such earlier devices is that the pin must be inserted into the sleeve from the
outside, which means that the sleeve must be readily accessible, making it difficult to
25 conceal, which is perceived on modern cars as a design problem, insofar as the presence of
tubes or tow hooks that break the design silhouette of the vehicle is often perceived
negatively. Yet another disadvantage is inherent in the adjustment of the shaft and sleeve
that must be done in order for the holes realized therein to line up with one another could
often be difficult to accomplish, particular when mounting occurs in the dark.

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Problem

A desire thus exists to provide a coupling device of the afore described type that overcomes the vibration problems that encumber earlier devices, that solves these problems without breaking the silhouette of the vehicle with protruding elements, and is designed so that no
5 adjustment of the shaft relative to the sleeve needs to be carried out.

Solution

The invention now proposed overcomes the aforementioned disadvantages by means of a coupling device of the type described above, characterized in that the securing device is
10 arranged on the shaft.

In a particular embodiment the securing device consists of a lever link which, at a first end, is pivotably arranged on the shaft at the end of the shaft that is mounted to the sleeve and, at a second end, in connection by means of a tension mechanism with the shaft, by means of which tension mechanism the lever link can be pivoted in a direction away from the shaft,
15 whereupon the lever link and the shaft are brought into secure clamping engagement with the sleeve when the shaft is mounted to the sleeve.

In another particular embodiment the sleeve has a pin that extends inside the sleeve between the inner walls of the sleeve and the lever link has a notch that engages with the pin in form-locking fashion, whereupon the secure clamping engagement occurs between
20 the inner walls of the sleeve and the shaft respectively between said pin and notch.

In yet another embodiment, the lever link is acted upon by an elastic element in a direction away from the shaft, whereupon the lever link is pushed against the pin when the shaft is mounted to the sleeve, and whereupon the notch in the lever link snaps into contact with the pin when the shaft is introduced into the sleeve.

25 In a further embodiment is the circumference of the sleeve confined of the pin and the sleeve walls

Description of figures

The invention is described below with reference to the accompanying figures, wherein:
30 Figure 1 is a partial view of the rear section of a vehicle to which a load carrier is coupled;

- Figure 2 is a plan view of a coupling device according to the invention;
Figure 3 is a side view of a coupling device according to the invention;
Figures 4 - 6 are side views in partial section of a coupling device according to the invention in three different coupling configurations;
5 Figure 7 is a view of a coupling device according to the invention as viewed from the side, facing out from the rear section of the vehicle;
Figure 8 is a sectional view of the section A-A in Figure 8;
figure 9 is a sectional view of the section B-B in Figure 3 and
Figure 10 is a view, corresponding to Figure 6, of a somewhat modified coupling device
10 according to the invention.

Preferred embodiments

- Figure 1 is a schematic view of a rear section 1 of a vehicle. A load carrier 2 is coupled to the rear section by means of coupling devices 3. Figure 2 show that the coupling device 3
15 comprises a sleeve 4, a shaft 5 and a securing device 6. A mounting plate 7 is arranged on the sleeve 4 and the mounting plate joins the sleeve to the vehicle (not shown in the figure).
Figure 3 shows that a first end 8 of the shaft 5 is mounted to the sleeve 4, the end 8 is inserted into the sleeve 4. A second end 9 of the shaft 5 is joined to the load carrier 2 (not shown in the figure).
20 The securing device 6 is described in greater detail below with reference to figures 6 - 8.
The securing device comprises a lever link 10 which, at a first end 11, is pivotably connected by means of a pivot axes 12 to the first end 8 of the shaft 5. The lever link 10 extends along the shaft 5 and has at its second end 13 a tension mechanism 14, by means of which the lever link can be pivoted around the pivot axes 12 away from the shaft 5 in the
25 direction indicated by the arrow P.
The tension mechanism comprises a nut 15 which is fixedly connected to the lever link in a known manner. A screw 16 cooperates with the nut 15, which screw 16 is equipped with a knob 17. The screw 16 is threaded into the nut 15, and the screw 16 is in abutment with the shaft 5 at the end 18 of the screw opposite to the knob. An elastic element 19, which has the
30 form of a helical spring in the figures, is arranged around the screw 16. The elastic element

19 is connected in a known manner at a first end 20 to the lever link 10, and at a second end 21 in abutment with the shaft 5. It will be apparent to one skilled in the art that the elastic element 19 acts upon the lever link 10 in the direction of the arrow P, and that the lever link can be pushed down toward the shaft 5, see Figure 5, against the force exerted by the elastic
5 element when the screw 16 is screwed up in the direction of the arrow P and thus will not abut the shaft 5.

The lever link is depicted with a U-shaped cross-section and, as shown, the lever link straddles the shaft. This shape is of value per se, in that the lever link is thereby given guidance in relation to the shaft, although this shape is of no importance to the function of
10 the invention, and the lever link may exhibit any cross-section whatsoever that is sufficiently strong to be able to function satisfactorily.

As shown in figures 4 and 9, the sleeve 4 has a pin 22 that extends transversely in the sleeve, while the lever link 10 has a notch 23. The function of the pin and the notch will be described below.

15 The function of the coupling device will be described below with reference to figure 4 - 9. When a coupling device according to the present invention is to be coupled together, the first end 8 of the shaft 5 is mounted in the sleeve 4 in the manner shown in Figure 4. The end 8 is equipped with a bushing 24, but this bushing has no importance to the invention and will consequently not be described further. In the position shown in Figure 4, the screw
20 16 has been screwed up to a position such that it is no longer in contact with the shaft 5 (not shown in the figures). The lever link 10 is held in its position by the elastic element 19. The shaft 5 is then moved in the direction of the arrow F to the position shown in Figure 5. In this position the lever link 10 meets the pin 22 and, because the screw 16 has been screwed up, the link 10 will be pushed downward against the shaft 5 towards the force exerted by
25 the elastic element 19 (not visible in the figure), which is working to press the link 10 in the direction of the arrow P. The shaft part 5 is then moved further into the sleeve 4 in the direction of the arrow F to the position shown in Figure 6 and, in this position, the elastic element 19 (not visible in the figure) snaps the notch 23 into abutment about the pin 22. An indication that the shaft 5 has been moved to its proper position in the sleeve 4 is thus
30 obtained. In this position the screw 16 is tightened and the lever link 10 is moved in the

direction of the arrow P, whereupon the shaft 5 is pushed against the inner walls 25 of the sleeve 4, while the notch 23 in the lever link 10 is simultaneously pushed against the pin 22 as shown in Figure 9. A stable, secure and non-slipping connection can be achieved between the sleeve and the shaft 5 by forcefully tightening the screw 16, while the pin 22
5 and the notch 23 simultaneously ensure that the shaft cannot be displaced from the sleeve 4. Figure 10 shows a coupling device according to the present invention that lacks the pin 22 and, in this arrangement, the connection is realized in that the lever link 10 and the shaft 5 are pushed against the inner walls 24 of the sleeve 4 to produce a fixed and secure connection.

10 The sleeve part has been depicted in the description above as a square tube, and the shaft part as a round tube. It will be apparent to one skilled in the art that both the sleeve part and the shaft part can exhibit any cross-section whatsoever, assuming that the shaft part can be inserted into the sleeve part. It is also apparent to the one skilled in the art, with regards to the designs where the pin 22 engages with the notch 23, that the wall parts 26 and 27, fig.9,
15 of the sleeve 4 can be omitted. Thereby is the circumference of the sleeve confined of the pin and the remaining parts of the sleeve walls 24. Furthermore, the elastic element 19 has been depicted as a helical spring, but it will be apparent to one skilled in the art that any other elastic element that provides the described function could be used. The invention is thus not limited to the foregoing description, but rather solely by the claims that follow.

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CLAIMS

1. A coupling device (3), for coupling a load carrier (2) to a vehicle, preferably to the rear section (1) of the vehicle. The coupling device comprises a sleeve (4), which is mounted on the rear section (1), and a shaft (5), which is mounted on the load carrier (2), and the coupling is realized in that the shaft (5) is mounted into the sleeve (4), whereupon the shaft (5) is secured to the sleeve by means of a securing device (6), which is arranged on the shaft (5), CHARACTERIZED IN THAT the securing device (6) comprises a lever link (10) that is, at a first end (11), pivotably arranged on the shaft (5) at its first end (8) by means of a pivot axes (12), which first end (8) is mounted to the sleeve (4) and, at a second end (13), in connection by means of a tension mechanism (14) with the shaft (5). The lever link (10) can be pivoted by the tension mechanism in a direction (P) away from the shaft (5), whereupon the lever link (10) and the shaft (5) are brought into secure clamping engagement with the inner walls (25) of the sleeve (4) when the shaft (5) is mounted to the sleeve (4).
2. A coupling device (3), for coupling a load carrier (2) to a vehicle, preferably to the rear section (1) of the vehicle. The coupling device comprises a sleeve (4), which is mounted on the rear section (1), and a shaft (5), which is mounted on the load carrier (2), and the coupling is realized in that the shaft (5) is mounted into the sleeve (4), whereupon the shaft (5) is secured to the sleeve by means of a securing device (6), which is arranged on the shaft (5), CHARACTERIZED IN THAT the sleeve (4) comprises a pin (22) that extends transversely in the sleeve (4), in that the securing device (6) comprises a lever link (10) that is, at a first end (11), pivotably arranged on the shaft at its first end (8) by means of a pivot axis (12), which first end (8) is mounted to the sleeve (4) and, at a second end (13), in connection by means of a tension mechanism (14) with the shaft (5), in that the lever link (10) has a notch (23), in that the lever link (10) can be pivoted by the tension mechanism (14) in a direction (P) away from the shaft, whereby the notch (23) is brought into

engagement with the pin (22), whereupon the shaft is brought into secure clamping connection with the sleeve (4) via the engagement between the shaft (5) and the inner walls (25) of the sleeve respectively between the pin (22) and the notch (23).

5 3. A coupling device (3) according to claim 2 CHARACTERIZED IN THAT the lever
link (10) is acted upon by an elastic element (19), which pushes the lever link (10)
in a direction (P) away from the shaft, whereupon the lever link is pushed against
the pin (22) when the shaft (5) is mounted into the sleeve (4) in a direction (F),
whereupon the notch (23) is snapped around the pin (22) when the shaft (5) is
10 moved to a position in which the notch encounters the pin.

4. A coupling device (3) according to claim 2 or 3 CHARACTERIZED IN THAT the
sleeve (4) circumference is confined of the sleeve walls (24) and the pin (22).

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Fig. 1

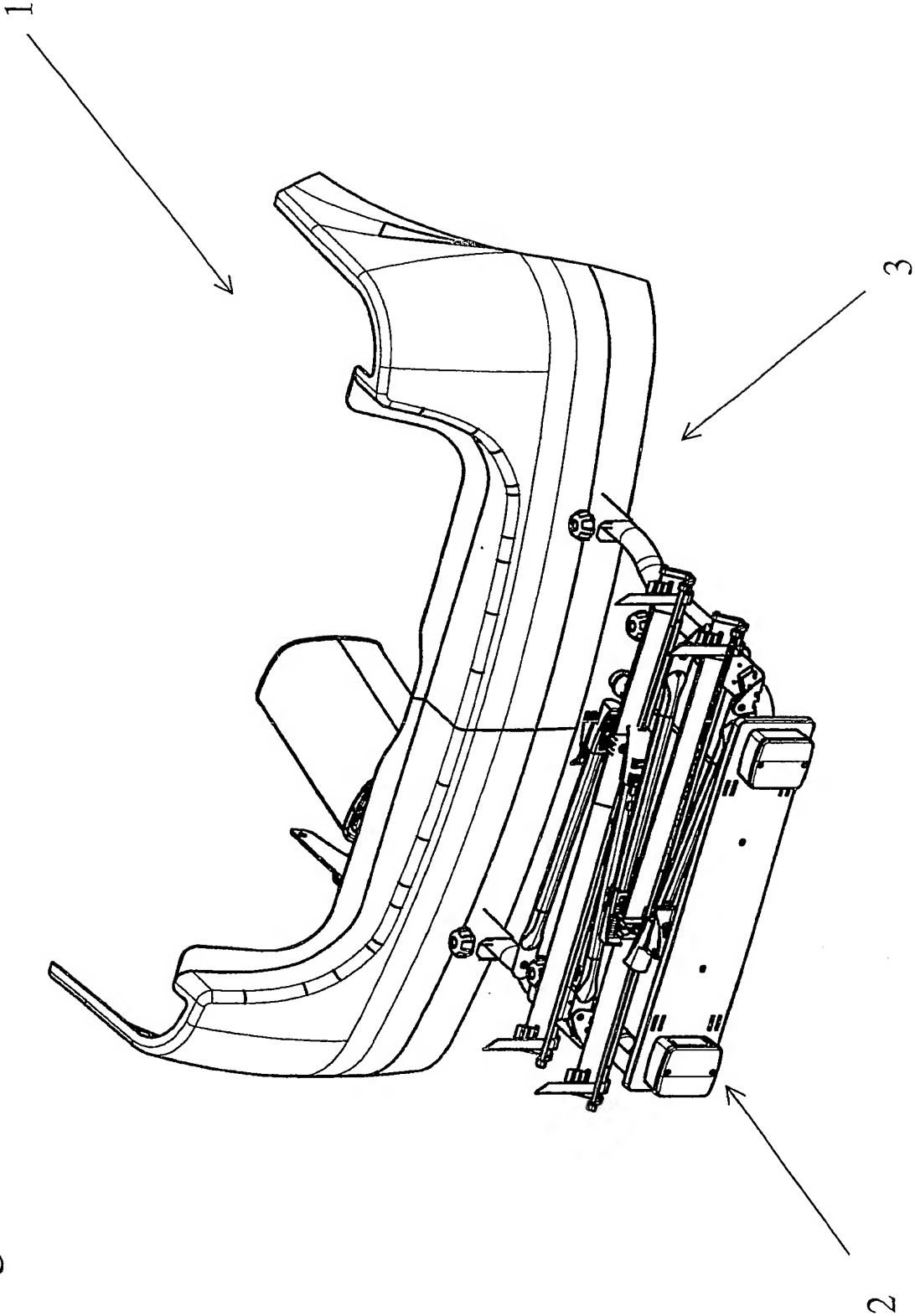
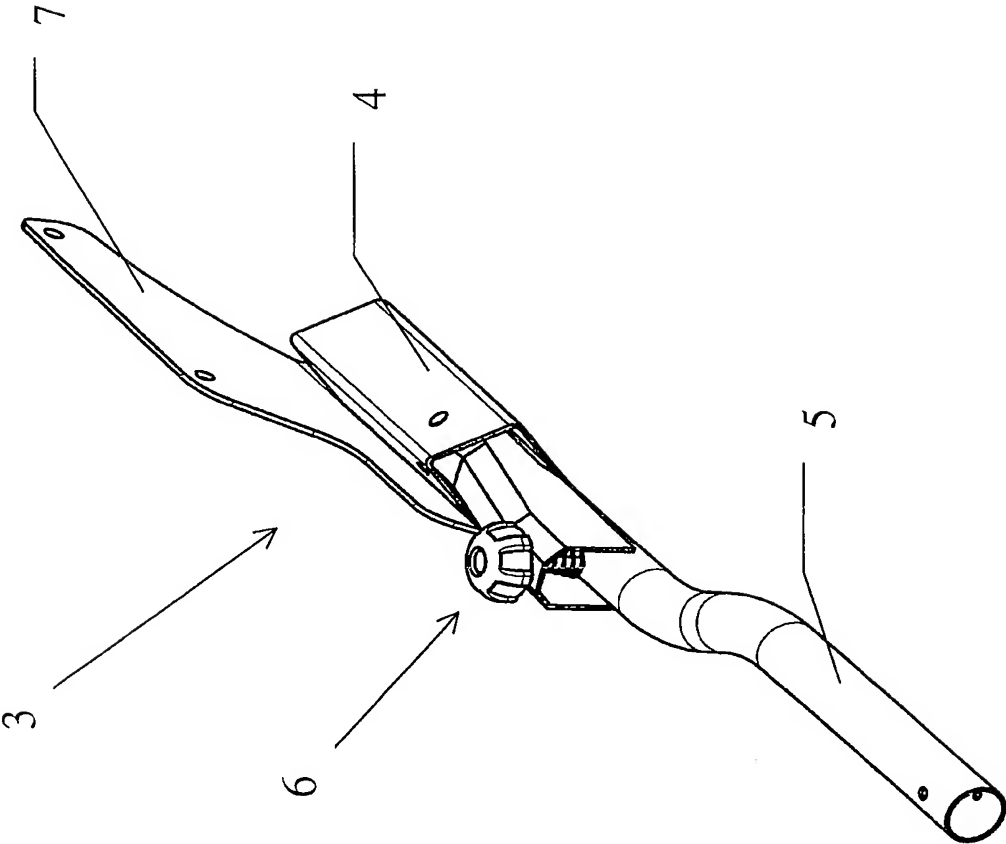


Fig. 2



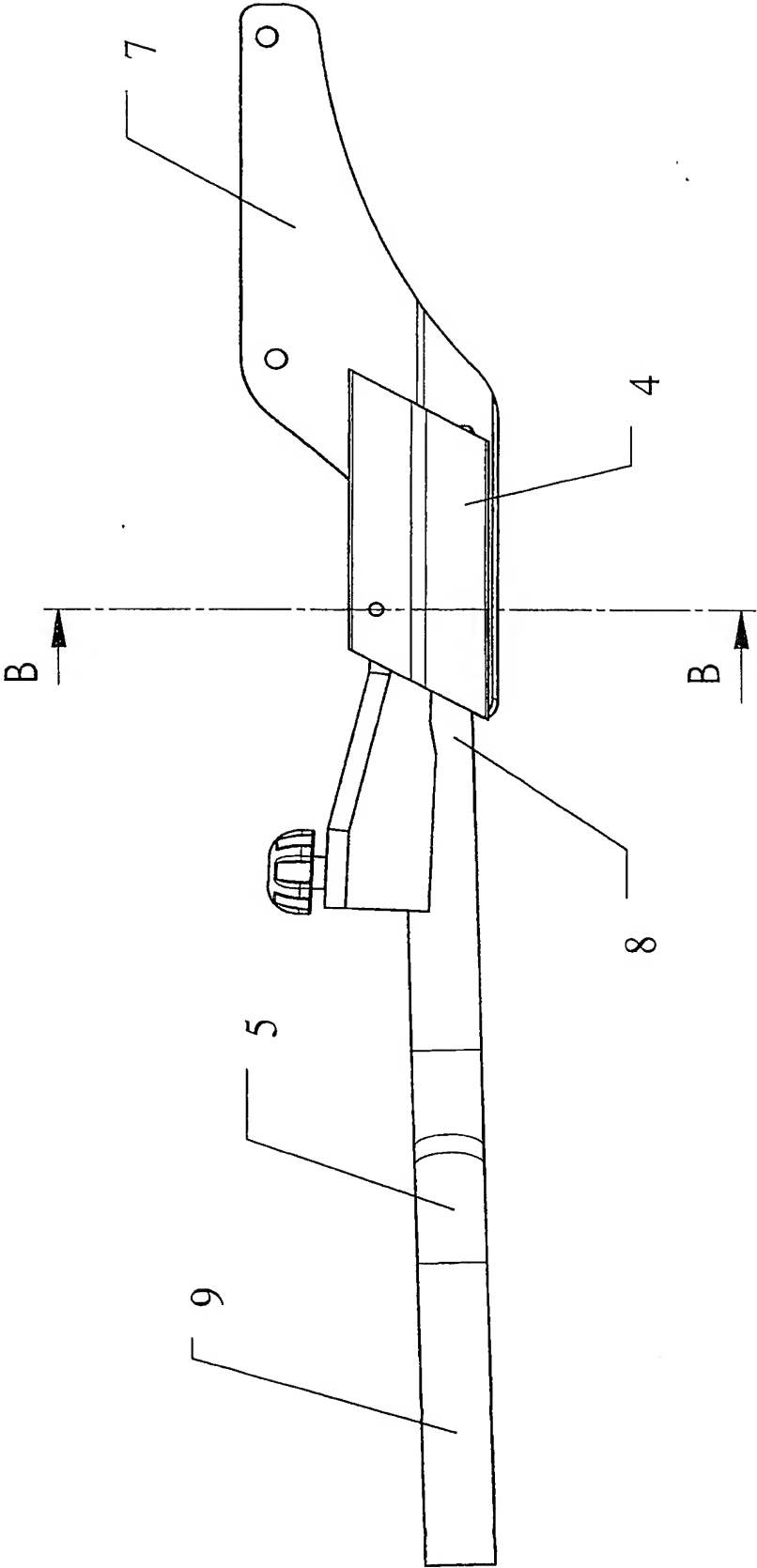
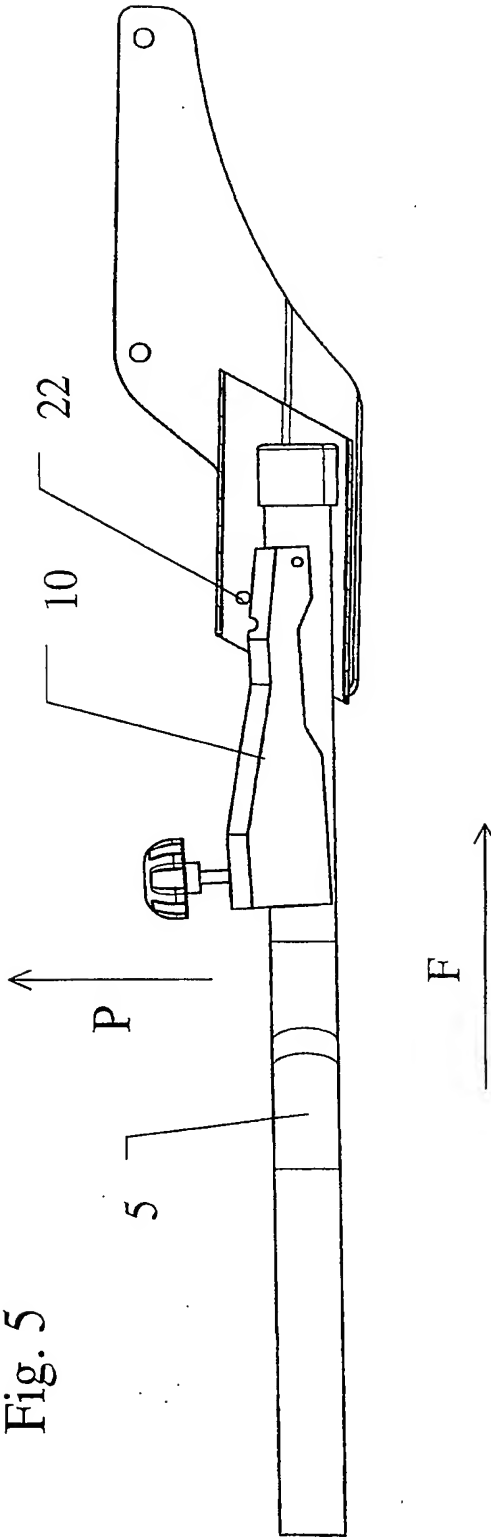
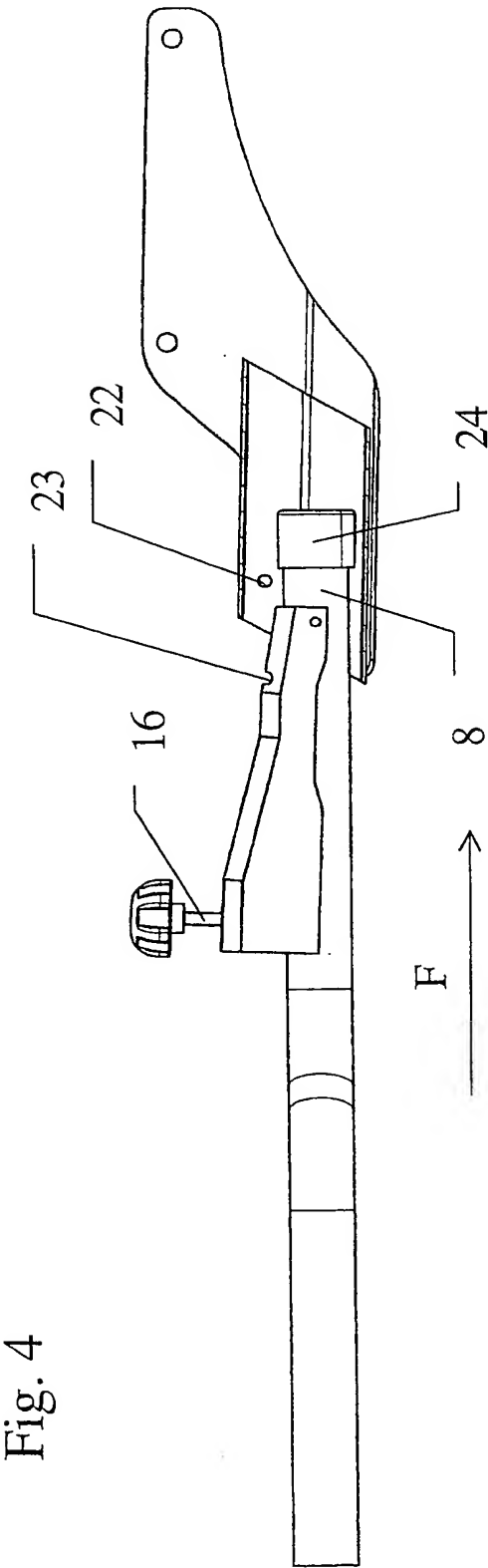
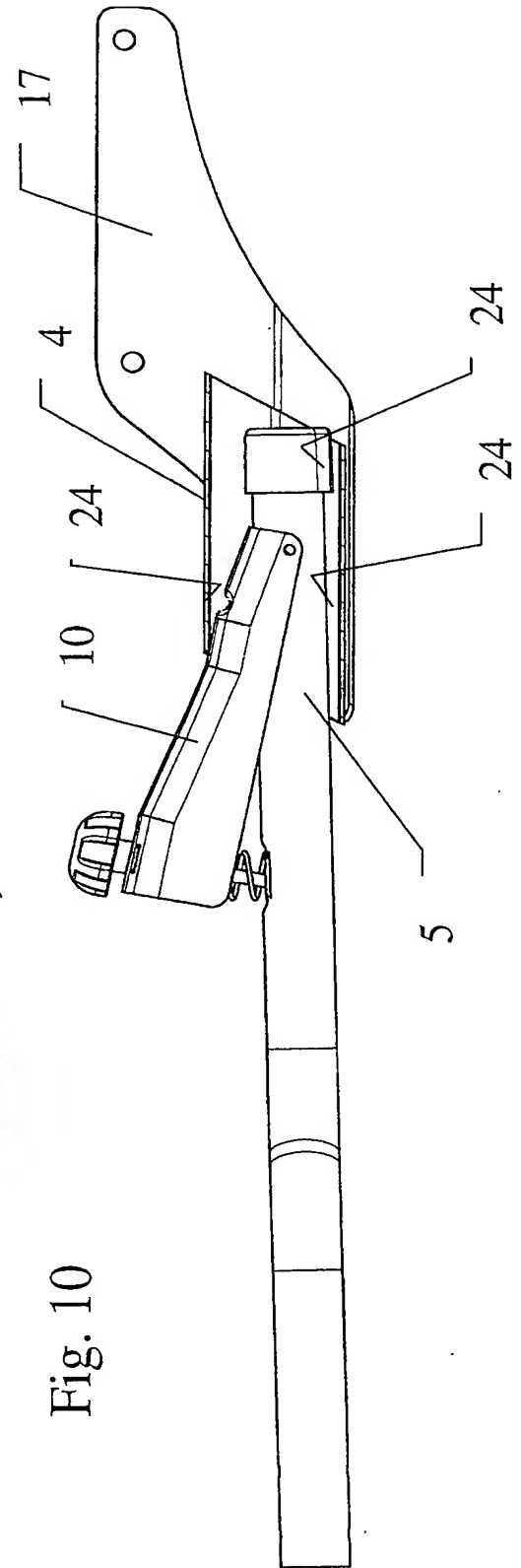
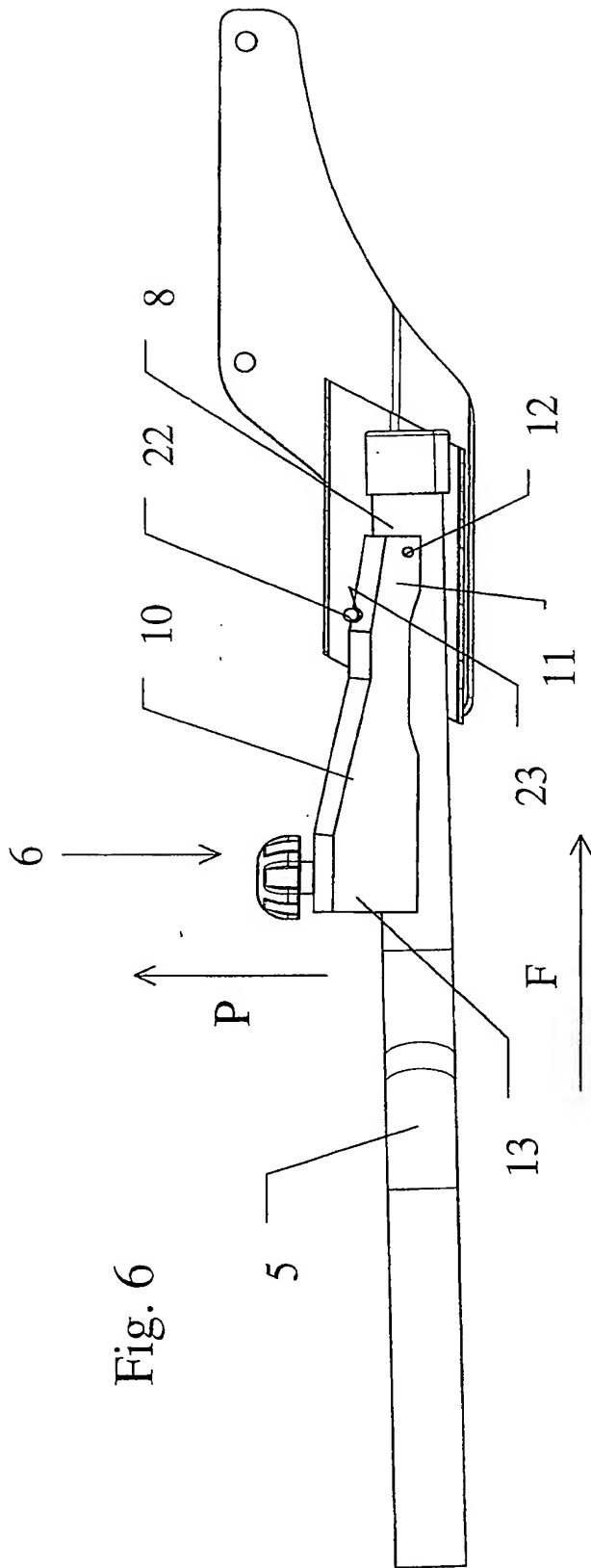


Fig. 3





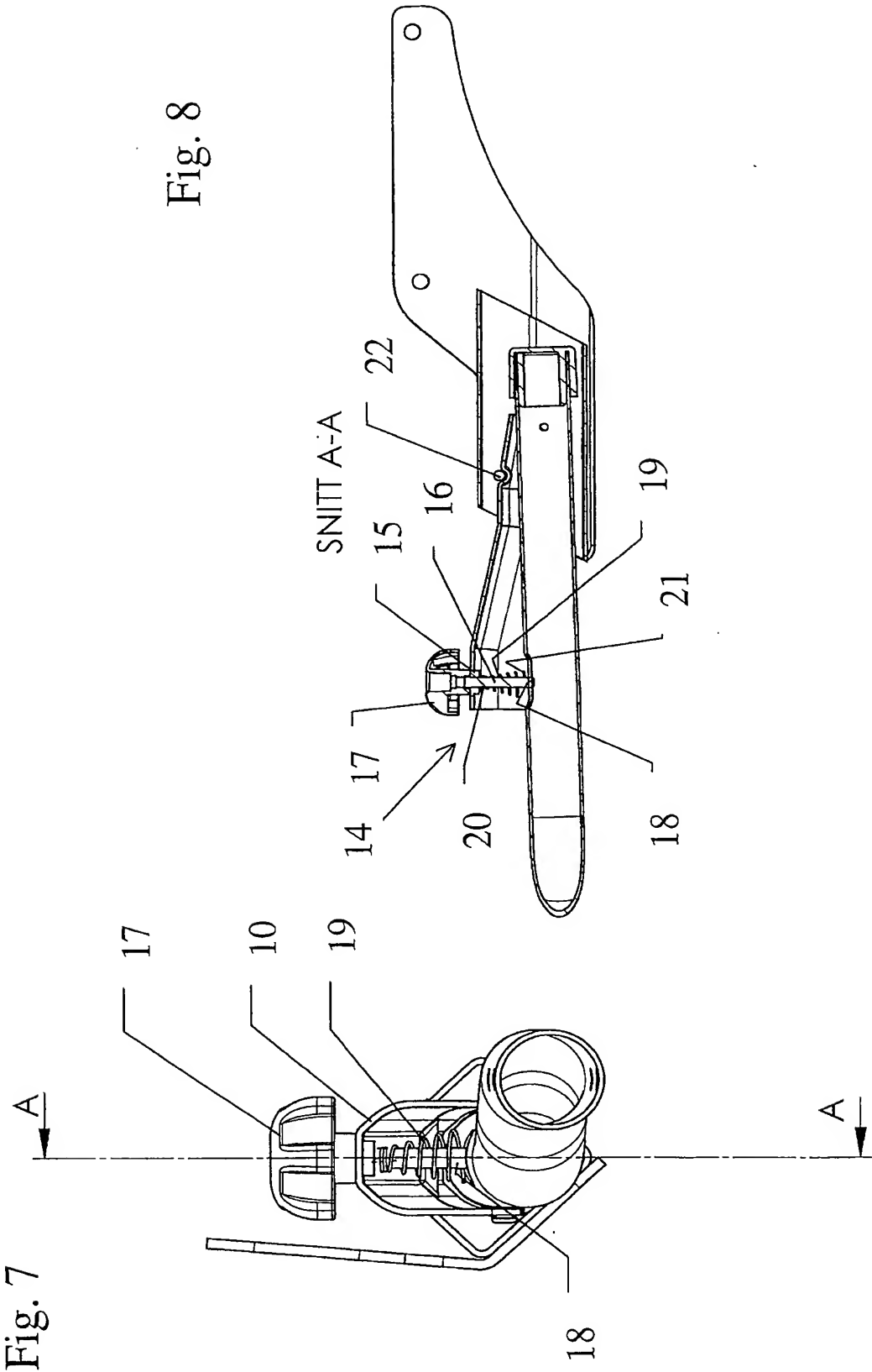
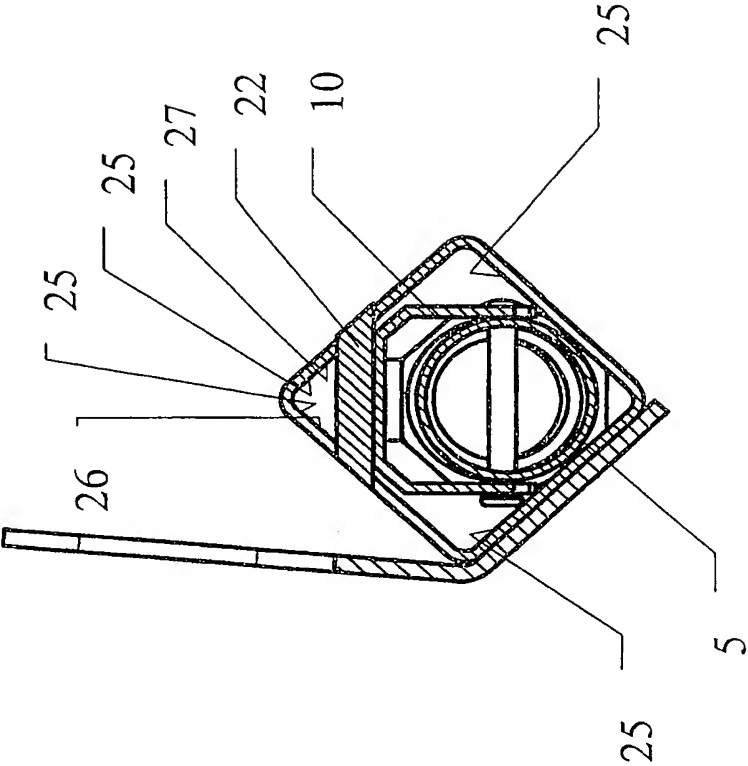


Fig. 9

SNITT B-B



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 02/01867

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B60R 9/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9405526 A1 (TITTEL, EBERHARD), 17 March 1994 (17.03.94) --	1,2
A	WO 0140024 A1 (SAAB AUTOMOBILE AB), 7 June 2001 (07.06.01) -- -----	1,2

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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